

What is claimed is:

1. A molded coupling lens, for use in an optical pickup apparatus, comprising:

a first surface including a first optical surface,
a second surface located opposite to the first surface and including a second optical surface, and
a flat surface section provided substantially in parallel with a plane including an optical axis of the molded coupling lens so as to connect the first surface and the second surface,
wherein an outer peripheral shape of the first optical surface is a circle.

2. The molded coupling lens of claim 1, further comprising:

a second flat surface section located opposite to the flat surface section and provided substantially in parallel with a plane including an optical axis of the molded coupling lens so as to connect the first surface and the second surface.

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3. The molded coupling lens of claim 1, wherein the outer peripheral shape of the second optical surface is a circular arc having a diameter larger than that of the first optical surface.

4. The molded coupling lens of claim 1, wherein the first optical surface is applied with a correction for an optical error caused at the time of molding.

5. The molded coupling lens of claim 4, wherein the correction for the optical error is a correction for astigmatism.

6. The molded coupling lens of claim 3, wherein the molded coupling lens is shaped to change the divergent angle of a light flux emitted from a semiconductor laser generator.

7. An optical pickup apparatus for recording or reproducing information in an optical information recording medium, comprising:

a light source to emit a light flux;

a coupling lens to change a divergent angle of the light flux; and

an objective lens to converge the light flux onto an information recording plane of the optical information recording medium through the coupling lens,

wherein the coupling lens is a molded coupling lens comprising:

a first surface including a first optical surface,
a second surface located opposite to the first surface and including a second optical surface, and

a flat surface section provided substantially in parallel with a plane including an optical axis so as to connect the first surface and the second surface, and

wherein an outer peripheral shape of the first optical surface is a circle.

8. The optical pickup apparatus of claim 7, wherein the molded coupling lens further comprises:

a second flat surface section located opposite to the flat surface section and provided substantially in parallel with the plane including an optical axis of the molded coupling lens so as to connect the first surface and the second surface.

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9. The optical pickup apparatus of claim 7, wherein an outer peripheral shape of the second optical surface is a circular arc having a diameter larger than that of the first optical surface.

10. The optical pickup apparatus of claim 9, wherein the molded coupling lens is arranged such that the light flux is emitted to enter into the first optical surface and to exit from the second optical surface.

11. The optical pickup apparatus of claim 10, further comprising:

a diaphragm having an aperture to regulate an amount of the light flux,

wherein the diaphragm is movable in parallel to the plane including the optical axis.

12. The optical pickup apparatus of claim 11, wherein a diameter of the aperture of the diaphragm is smaller than that of the second optical surface.

13. The optical pickup apparatus of claim 7, wherein the first optical surface of the molded coupling lens is applied

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with a correction for an optical error caused at the time of molding.

14. The optical pickup apparatus of claim 7, further comprising:

a mirror to change the optical axis by 90 degrees in angle so that the flat surface section is arranged in parallel to the information recording plane of the optical information recording medium.

15. A molding die to produce a molded coupling lens which comprises a first surface including a first optical surface, a second surface located opposite to the first surface and including a second optical surface, and a flat surface section provided substantially in parallel with a plane including an optical axis so as to connect the first surface and the second surface, wherein an outer peripheral shape of the first optical surface is a circle, the molding die comprising:

a molding die body having a hollow portion corresponding to an outer figure of the second surface and the flat surface of the molded coupling lens; and

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a core having a circular inner surface corresponding to an outer figure of the first optical surface and adapted to be detachably mounted in the molding die,

wherein the circular inner surface of the core has a first curved surface parallel to the plane including the optical axis and a second curved surface perpendicular to the plane including the optical axis, and the first curved surface is shaped to be different from the second curved surface so as to correct an optical error caused at the time of molding.

16. The molding die of claim 15, wherein the core is rotatable so as to adjust a position of the circular inner surface of the core.

17. The molding die of claim 15, wherein the correction for the optical error is a correction for astigmatism.

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